CLAIMS

1. Tyre for two-wheeled vehicles, comprising:
   - a carcass structure with at least one carcass ply shaped in a substantially toroidal configuration, the opposite lateral edges of which are associated with respective right-hand and left-hand bead wires, each bead wire being enclosed in a respective bead;
   - a belt structure applied in a circumferentially external position relative to said carcass structure;
   - a tread band superimposed circumferentially on said belt structure;
   - a pair of side walls applied laterally on opposite sides relative to said carcass structure;

   wherein said belt structure is associated with at least one layer of a crosslinked elastomeric material comprising:
   (a) at least one diene elastomeric polymer;
   (b) at least one layered inorganic material having an individual layer thickness of from 0.01 nm to 30 nm.

2. Tyre for two-wheeled vehicles according to claim 1, wherein said at least one layered inorganic material has an individual layer thickness of from 0.05 nm to 15 nm.

3. Tyre for two-wheeled vehicles according to claim 1, wherein said layered inorganic material is intercalated in the elastomeric material.

4. Tyre for two-wheeled vehicles according to claim 1, wherein said layered inorganic material is exfoliated in the elastomeric material.

5. Tyre for two-wheeled vehicles according to claim 1, wherein said layered inorganic material (b)

exhibits, in the elastomeric material, a d-spacing value in X-ray diffraction analysis of at least 10% higher with respect to the d-spacing value of the layered inorganic material (b) before dispersing it into the diene elastomeric polymer (a).

6. Tyre for two-wheeled vehicles according to claim 5, wherein said layered inorganic material (b) exhibits, in the elastomeric material, a d-spacing value in X-ray diffraction analysis of at least 20% higher with respect to the d-spacing value of the layered inorganic material (b) before dispersing it into the diene elastomeric polymer (a).

7. Tyre for two-wheeled vehicles according to claim 1, wherein said belt structure comprises at least one layer of a plurality of circumferential coils, axially arranged side by side, of at least one cord wound at substantially-null angle with respect to the equatorial plane of the tyre.

8. Tyre for two-wheeled vehicles according to claim 1, wherein said belt structure comprises two layers of cords oriented according to two preferred directions crossing each other in the two layers and preferably simmetrically inclined in relation to the equatorial plane of the tyre.

9. Tyre for two-wheeled vehicles according to claim 1, wherein said belt structure comprises a combination of the structure according to claim 7 with the structure according to claim 8.

10. Tyre for two-wheeled vehicles according to claim 1, wherein said at least one layer of a crosslinked elastomeric material is placed between said carcass structure and said belt structure.

11. Tyre for two-wheeled vehicles according to claim 1, wherein said at least one layer of a crosslinked elastomeric material is placed between said tread band and said belt structure.

12. Tyre for two-wheeled vehicles according to any one of the preceding claims, wherein said layer of elastomeric material has a thickness of between 0.075 mm and 5 mm.

13. Tyre for two-wheeled vehicles according to claim 12, wherein said layer of elastomeric material has a thickness of between 0.4 mm and 3 mm.

14. Tyre for two-wheeled vehicles according to any one of the preceding claims, wherein the layered inorganic material (b) is present in the elastomeric material in an amount of from 1 phr to 120 phr.

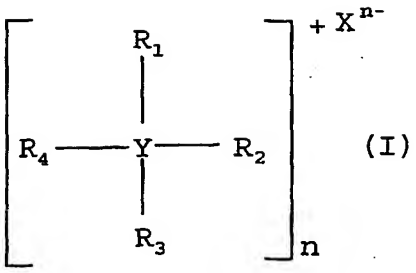
15. Tyre for two-wheeled vehicles according to claim 14, wherein the layered inorganic material (b) is present in the elastomeric material in an amount of from 5 phr to 80 phr.

16. Tyre for two-wheeled vehicles according to any one of the preceding claims, wherein the layered inorganic material (b) is selected from phyllosilicates such as: smectites, such as, montmorillonite, nontronite, beidellite, volkonskoite, hectorite, saponite, sauconite; vermiculite; halloisite; sericite; or mixtures thereof.

17. Tyre for two-wheeled vehicles according to claim 16, wherein the layered inorganic material (b) is montmorillonite.

18. Tyre for two-wheeled vehicles according claim 16 or 17, wherein the layered inorganic material (b) is surface-treated with a compatibilizer.

19. Tyre for two-wheeled vehicles according to claim 18, wherein the compatibilizer is selected from the quaternary ammonium or phosphonium salts having general formula (I):



(I)

wherein:

- Y represents N or P;
- R_1, R_2, R_3 and R_4, which may be identical or different, represent a linear or branched C_1-C_{20} alkyl or hydroxyalkyl group; a linear or branched C_1-C_{20} alkenyl or hydroxyalkenyl group; a group $-R_5-SH$ or R_5-NH wherein R_5 represents a linear or branched C_1-C_{20} alkylene group; a C_6-C_{18} aryl group; a C_7-C_{20} arylalkyl or alkylaryl group; a C_5-C_{18} cycloalkyl group, said cycloalkyl group possibly containing hetero atom such as oxygen, nitrogen or sulphur;
- X^{n-} represents an anion such as the chlorine ion, the sulphate ion or the phosphate ion;
- n represents 1, 2 or 3.

20. Tyre for two-wheeled vehicles according to any one of the preceding claims, wherein the diene elastomeric polymer (a) has a glass transition temperature (T_g) below 20°C.

21. Tyre for two-wheeled vehicles according to claim 20, wherein the diene elastomeric polymer (a) is selected from: cis-1,4-polyisoprene, 3,4-polyisoprene, polybutadiene, optionally halogenated isoprene/isobutene copolymers, 1,3-butadiene/acrylonitrile copolymers, styrene/1,3-butadiene copolymers, styrene/isoprene/1,3-butadiene copolymers, styrene/1,3-butadiene/acrylonitrile copolymers, or mixtures thereof.

22. Tyre for two-wheeled vehicles according to any one of the preceding claims, wherein the elastomeric

material comprises at least one elastomeric polymer of one or more monoolefins with an olefinic comonomer or derivatives thereof (a').

23. Tyre for two-wheeled vehicles according to claim 22, wherein the elastomeric polymer (a') is selected from: ethylene/propylene copolymers (EPR) or ethylene/propylene/diene copolymers (EPDM); polyisobutene; butyl rubbers; halobutyl rubbers; or mixtures thereof.

24. Tyre for two-wheeled vehicles according to any one of the preceding claim, wherein the elastomeric material further comprises at least one silane coupling agent (c).

25. Tyre for two-wheeled vehicles according to claim 24, wherein the silane coupling agent (c) is selected from those having at least one hydrolizable silane group which may be identified by the following structural formula (II):

$$(R)_3Si-C_nH_{2n}-X \quad (II)$$

in which the groups R, which may be identical or different, are selected from: alkyl, alkoxy or aryloxy groups or from halogen atoms, on condition that at least one of the groups R is an alkoxy or aryloxy group; n is an integer between 1 and 6 inclusive; X is a group selected from: nitroso, mercapto, amino, epoxide, vinyl, imide, chloro, $-(S)_mC_nH_{2n}-Si-(R)_3$ in which m and n are integers between 1 and 6 inclusive and the groups R are defined as above.

26. Tyre for two-wheeled vehicles according to claim 24 or 25, wherein the silane coupling agent (c) is present in the elastomeric material in an amount of from 0.01 phr to 10 phr.

27. Tyre for two-wheeled vehicles according to claim 26, wherein the silane coupling agent (c) is present in an amount of from 0.5 phr to 5 phr.

28. Tyre for two-wheeled vehicles according to any one of the preceding claims, wherein at least one additional reinforcing filler is present in an amount of between 0.1 phr and 120 phr in the elastomeric material.

29. Tyre for two-wheeled vehicles according to claim 28, wherein the reinforcing filler is carbon black.

30. Tyre for two-wheeled vehicles according to claim 28, wherein the reinforcing filler is silica.

31. Tyre for two-wheeled vehicles according to claim 30, wherein at least one silane coupling agent (c) is present.

32. Process for producing a tyre for two-wheeled vehicles, said process comprising the following steps:

- manufacturing a green tyre by assembling at least one carcass ply, a belt structure in a circumferentially outer position with respect to said carcass ply, a tread in a circumferentially outer position with respect to said belt structure;
- subjecting the green tyre to moulding in a mould cavity formed in a vulcanization mould;
- subjecting said green tyre to crosslinking by heating;

said process further comprising the step of associating at least one layer of a crosslinkable elastomeric material with said belt structure, said elastomeric material comprising:

(a) at least one diene elastomeric polymer;

(b) at least one layered inorganic material having an individual layer thickness of from 0.01 nm to 30 nm.

33. Process according to claim 32, wherein said at least one layered inorganic material has an individual layer thickness of from 0.05 nm to 15 nm.

34. Process according to claim 32 or 33, wherein said layered inorganic material is intercalated in the elastomeric material.

35. Process according to any one of claim 32 or 34, wherein said layered inorganic material is exfoliated in the elastomeric material.

36. Process according to any one of claims 32 to 35, wherein said layer of elastomeric material has a thickness of between 0.075 mm and 5 mm.

37. Process according to claim 36, wherein said layer of elastomeric material has a thickness of between 0.4 mm and 3 mm.

38. Process according to any one of claims 32 to 37, wherein said layered inorganic material (b) exhibits, in the elastomeric material, a d-spacing value in X-ray diffraction analysis of at least 10% higher with respect to the d-spacing value of the layered inorganic material (b) before dispersing it into the diene elastomeric polymer (a).

39. Process according to claim 38, wherein said layered inorganic material (b) exhibits, in the elastomeric material, a d-spacing value in X-ray diffraction analysis of at least 20% higher with respect to the d-spacing value of the layered inorganic material (b) before dispersing it into the diene elastomeric polymer (a).

40. Process according to any one of claims 32 to 39, wherein said at least one layer of crosslinkable elastomeric material is obtained by winding at least one ribbon-like band consisting of said crosslinkable elastomeric material in side by side coils.

41. Process according to any one of claims 32 to 40, wherein the layered inorganic material (b) is defined according to any one of claims 14 to 19.

42. Process according to any one of claims 32 to 41,

wherein the diene elastomeric polymer (a) is defined according to claim 20 or 21.

43. Process according to any one of claims 32 to 42, wherein the elastomeric material comprises at least one elastomeric polymer of one or more monoolefins with an olefinic comonomer or derivatives thereof (a') as defined according to claim 23.

44. Process according to any one of claims 32 to 43, wherein the elastomeric composition further comprises at least one coupling agent (c) as defined according to any one of claims 24 to 27.

45. Process according to any one of claims 32 to 44, wherein at least one additional reinforcing filler is present, in an amount of between 0.1 phr and 120 phr, in the elastomeric composition.

46. Process according to claim 45, wherein the reinforcing filler is carbon black.

47. Process according to claim 45, wherein the reinforcing filler is silica.

48. Process according to claim 47, wherein at least one silane coupling agent (c) is present.